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Nova Scotia Plantation Pest Assessment Survey Report for 1991

Plantations have become a way of life in forestry as a means to ensure future wood supply and production. Their growth and well-being is of utmost importance. Monitoring the forest pest situation in plantations is an essential step in their management and protection if they are to reach their potential. Injury resulting from insects or diseases adversely affects tree growth and development. Early detection of pest problems through regular plantation pest assessment and implementation of appropriate control measures will help to prevent the build up of disease or insect populations, thereby reducing the threat to the crop's commercial value.

This year (1991) marks the fifth year that plantation pest assessment surveys have been carried out in Nova Scotia. The cooperative effort by many agencies in the forest sector and FIDS continues. The survey objectives remain the same: to monitor forest insect and disease conditions, assess the levels of damage, summarize and analyze the information to identify plantations requiring immediate attention, and report the findings. Participating cooperators assess the plantations for pest conditions and the FIDS unit of Forestry Canada provides training, coordination, identification services, and data analysis. In 1991, the cooperating organizations in Nova Scotia included:

- Nova Scotia Dept. of Natural Resources
- Stora Forest Industries

Forestry Canada - Maritimes Region

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The assessments involved detailed examination of 50 trees in each of the selected plantations. Ten sub-plots of five trees were selected along a pre-determined line of travel through the plantation. The distance between sub-plots varied with plantation size to ensure an adequate representation of conditions. When field identification of pest problems was not possible, samples were collected and forwarded for identification at Forestry Canada.

Individual plantation pest assessment reports, with pest identifications, are prepared for cooperators and returned as quickly as possible to aid pest managers in decision making.

The purpose of this report is to provide pest managers with an overview of pest condition information from all plantations as assessed in Nova Scotia in 1991. The information in this report is presented in addition to the individual plantation pest assessment reports which are prepared for cooperators detailing pest problems in each of their plantations assessed this year.

The information presented in the tables and figures that follow is the result of summary and analysis of data collected from 115 plantations. Of these, 81 were spruce and 24 were pine (Table 1). The "other" category consists of five mixed wood species and three balsam fir. There were two silviculturally treated (thinned) areas assessed, one balsam fir and one black spruce.

A total of 5,750 trees were assessed this year. Analysis of overall tree condition shows that, on average, 89.5% of the trees were assessed as being healthy (Table 2). Figure 1 illustrates that over 50% of the plantations assessed have at least some incidence or moderate or severe injury for all species. Incidence was highest in the pines at 71% and slightly lower (62%) in the spruces. See Table 4 for a list of pests reported and responsible for the problems.

Table 1. Number of plantation assessments by tree species and organization conducting field work in the various resource management regions in Nova Scotia in 1991.

Region	Tree Species	Total plantations assessed	Organization		
			NSDNR	STORA	FIDS
CB	Jack pine	1	1	-	-
	Scots pine	1	1	-	-
	Black spruce	14	4	10	-
	Red spruce	1	1	-	-
	White spruce	10	10	-	-
	Mixed spruce	1	1	-	-
	Thinned	1	-	-	1
	Mixed	1	1	-	-
	Total for Region	**30**			
E	Black spruce	13	5	8	-
	Red spruce	2	-	2	-
	White spruce	2	1	-	1
	Norway spruce	3	2	1	-
	Spruce	1	-	1	-
	Mixed spruce	2	-	2	-
	Mixed	4	1	3	-
	Total for Region	**27**			
NC	Red pine	2	-	-	2
	Jack pine	1	-	-	1
	Black spruce	1	-	1	1
	Norway spruce	1	1	-	-
	Thinned	1	-	-	1
	Total for Region	**6**			
SC	White Spruce	1	1	-	-
	Total for Region	**1**			
SS	Red pine	4	4	-	-
	Black spruce	1	1	-	-
	Red spruce	3	3	-	-
	Norway spruce	1	1	-	-
	Mixed spruce	1	-	-	1
	Total for Region	**10**			
V	Red pine	2	2	-	-
	Red spruce	4	4	-	-
	Mixed spruce	2	2	-	-
	Total for Region	**8**			
W	Balsam fir	3	3	-	-
	Red pine	13	13	-	-
	Black spruce	2	2	-	-
	Red spruce	9	9	-	-
	Norway spruce	3	3	-	-
	Spruce	1	1	-	-
	Mixed spruce	2	2	-	-
	Total for Region	**33**			
	Total for Nova Scotia	**115**	**80**	**28**	**7**

CB = Cape Breton, E = Eastern, NC = North Central, SC= South Central, SS = South Shore, V = Valley, W = Western

Table 2. The condition of trees in plantations and thinned areas in Nova Scotia in 1991.

Species	Tree Condition			
	Healthy	Fair	Poor	Dead
Spruce	91.1	5.7	2.0	1.2
Pine	83.8	8.2	6.6	1.5
Thinned	86.0	4.0	4.0	6.0
Other	91.0	3.5	3.3	2.3
Average	89.5	6.1	3.1	1.4

Discussion

Shoestring root rot was reported in 11% of the spruce plantations surveyed this year. When this disease was observed anywhere in the plantation, it was recorded whether or not it was on the trees being assessed. For this reason, the high incidence is not reflected in the root section of Table 3. Root rot is a serious problem in young plantations because of the effect that it has on tree health. Like most root diseases, it affects whole-tree health by restricting water and nutrient uptake and subsequent transport up the stem, thereby slowing or arresting tree growth. Armillaria mellea, the fungus that causes shoestring root rot, persists in the soil, living on slash or litter, in the absence of living trees. Where young trees are present (less than 5 m), the disease may infect through damaged roots or be transmitted through root grafts with infected trees.

European pine shoot moth was reported in 71% of the pine plantations and was assessed as causing moderate or severe damage in 42% of them. This insect is the probable cause of shoot damage listed in Table 3, where shoot health falls well below the provincial average.

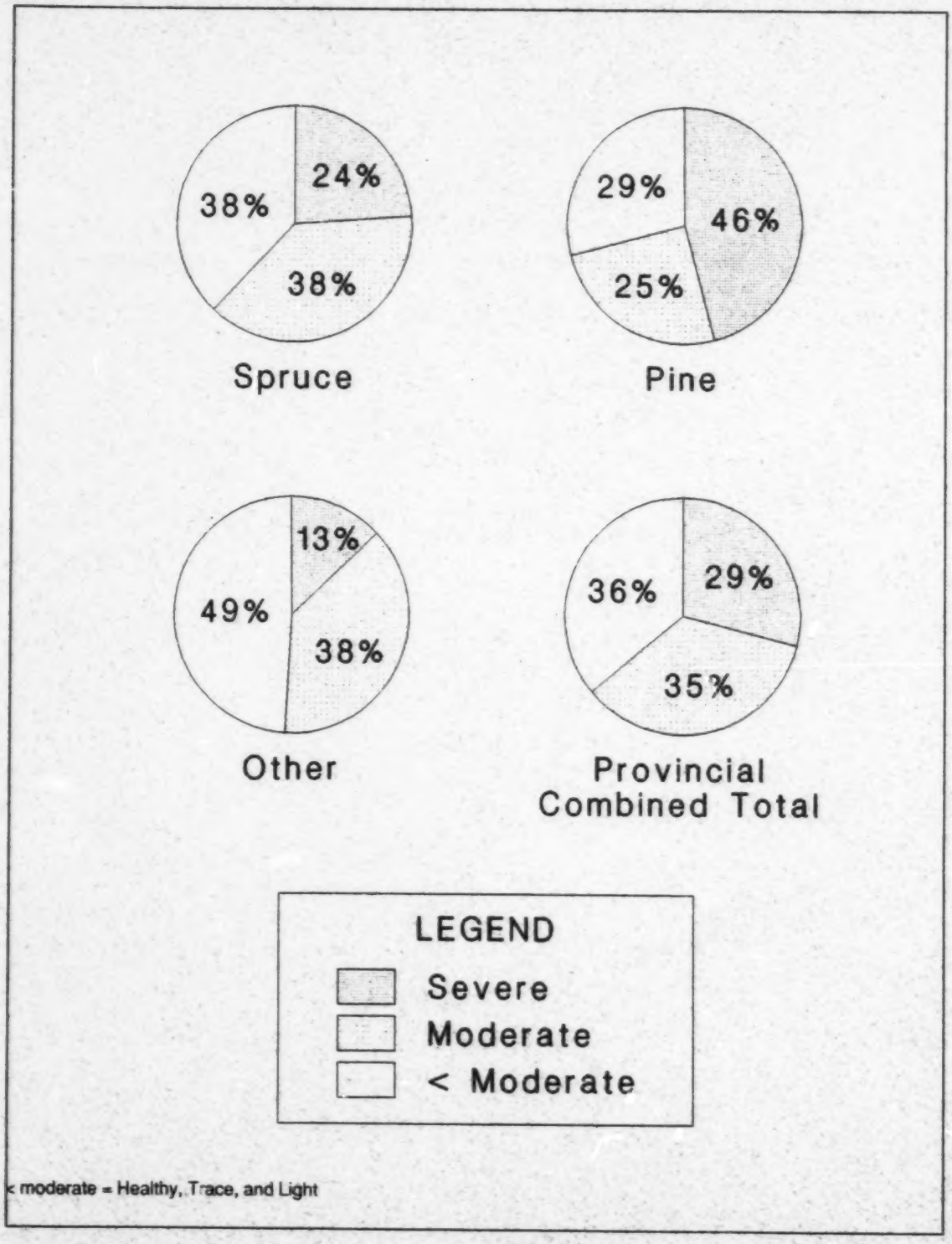
Sirococcus shoot blight was present in 13% of the pine plantations assessed this year (Table 4). This disease is considered to be severe wherever it exists, because of its virulence and potential threat to the trees.

Animal damage occurred in 33% of the pine and 50% of the spruce plantations assessed (Table 4). It was attributed mostly to porcupines.

Frost was recorded on 56% of the spruce trees assessed, but serious shoot or bud injury was not reported. The needle health is, however, slightly lower than the provincial average of 91%.

Mechanical damage and planting problems were assessed at high rates for all species surveyed this year. These types of problems will affect overall tree health and predispose them to insect attack or disease infection.

Figure 1 Levels of injury expressed as a percentage of total number of plantations assessed by species in Nova Scotia in 1991.



< moderate = Healthy, Trace, and Light

Table 3. Condition of trees by tree part in plantations and thinned areas assessed in Nova Scotia in 1991.

Tree part	Species	Healthy	Trace	Light	Moderate	Severe
Needles	Spruce	87.2	3.4	6.4	2.8	0.2
	Pine	55.6	19.5	8.7	13.5	2.7
	Thinned	25.5	46.8	0.0	27.7	0.0
	Other	95.7	3.3	0.5	0.5	0.0
Buds	Spruce	92.3	3.9	3.5	0.2	0.0
	Pine	88.0	2.3	6.8	1.9	1.0
	Thinned	61.7	38.3	0.0	0.0	0.0
	Other	100.0	0.0	0.0	0.0	0.0
Shoots	Spruce	92.9	4.9	1.8	0.4	0.0
	Pine	80.3	7.3	3.7	6.3	2.5
	Thinned	2.1	10.6	14.9	36.2	36.2
	Other	98.2	1.0	0.8	0.0	0.0
Branches	Spruce	92.3	3.0	2.6	1.6	0.4
	Pine	89.8	5.2	2.4	1.7	0.8
	Thinned	29.8	59.6	10.6	0.0	0.0
	Other	99.7	0.3	0.0	0.0	0.0
Stems	Spruce	92.7	1.1	2.8	3.7	0.9
	Pine	87.0	2.8	2.6	4.5	3.1
	Thinned	70.2	8.5	6.4	0.0	14.9
	Other	92.3	3.1	2.0	2.3	0.3
		Healthy	**Damaged**	**Dead**		
Leaders	Spruce	92.0	8.0	0.0		
	Pine	90.0	10.0	0.0		
	Thinned	97.0	3.0	0.0		
	Other	97.0	3.0	0.0		
		Healthy	**Dead**			
Roots	Spruce	98.0	2.0			
	Pine	99.0	1.0			
	Thinned	100.0	0.0			
	Other	99.0	1.0			

Table 4. Comparison of problems at trace and light levels of severity with those at moderate and severe levels as assessed in plantation pest surveys in Nova Scotia in 1991.

Problem		Percentage of Plantations Affected					
		Pine Damage		Spruce Damage		Other Damage	
		All levels	Mod. & Sev.	All levels	Mod. & Sev.	All levels	Mod. & Sev.
Insects							
Aphid		13	4	12	1	-	-
Bud scale		-	-	2	1	-	-
Bark beetle		-	-	4	-	-	-
Coneworm		13	8	1	-	-	-
European pine shoot moth		71	42	-	-	13	-
Gall adelgid		13	8	13	3	-	-
Hemlock looper		8	-	-	-	-	-
Needle miner		-	-	6	-	-	-
Pine cone beetle		8	-	-	-	-	-
Pine tortoise scale		4	4	-	-	-	-
Root collar weevil		8	8	4	2	-	-
Sawfly		17	-	24	13	-	-
Spider mite		21	4	6	2	-	-
Spittlebug		-	-	6	4	3	-
Spruce bud midge		4	-	5	-	-	-
Spruce bud moth		-	-	11	1	-	-
Spruce budworm		-	-	6	-	-	-
White pine weevil		4	-	6	4	-	-
Diseases							
Needle cast		-	-	2	-	-	-
Needle flecking		8	8	4	2	-	-
Needle rust		13	-	5	-	-	-
Sirococcus shoot blight		13	13	-	-	-	-
Shoestring root rot		-	-	11	11	-	-
Other							
Animal		33	21	50	17	-	-
Competion:	Hardwood	-	-	9	5	13	13
	Herbaceous	-	-	7	4	-	-
	Unspecified	8	-	11	5	-	-
Drought		-	-	7	4	-	-
Frost		4	-	56	13	25	-
Mechanical damage		17	4	11	4	100	75
Microsite		-	-	6	-	-	-
Planting		8	8	33	31	38	38
Snow damage		33	8	15	4	13	13
Weather		-	-	4	1	-	-
Wind damage		8	4	6	1	25	-
Winter damage		17	8	20	11	-	-

Calculations are based on the number of plantation assessments for each species: Pine = 24, Spruce = 82, and Other = 8.

Snow caused considerable damage this year in both pine and spruce plantations, but was significantly higher in the pine (33%) than in the spruce (15%) plantations (Table 4).

There were two thinned areas surveyed in Nova Scotia this year; the problems assessed as moderate or severe were: balsam twig aphid, balsam gall midge, and snow damage.

Analysis of this year's data shows that over 90% of the trees assessed are healthy. However, moderate or severe problems were detected in up to 70% of the plantations. Early detection of pests is one of the fundamental reasons for the plantation pest assessment surveys, as it provides information to pest managers while relatively few trees are affected and when control will be most effective and cost efficient.

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March 1992